.

WESTBY

City Clerk/Treasurer Public Works Department Phone (608) 634-3214 Fax (608) 634-3274 200 N. Main Westby, WI 54667

Electric & Water Utility
Phone (608) 634-3416
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6400

January 28, 2001

Jim Loock, Chief Electric Engineer Public Service Commission 610 N. Whitney Way P.O. Box 7854 Madison, WI 53707-7854

RE:

In the Matter of Filing Plans for Appropriate Inspection and

Maintenance, PSC Rule 113.0607.

Dear Mr. Loock:

Enclosed for filing are 3 copies of Westby Electric and Water Utilities Preventative Maintenance Plan detailing inspection maintenance schedules, condition rating criteria, corrective action schedules, record keeping procedures and report filing schedules as documented in this rule.

Very truly yours,

Gregg Hanson

Westby Director of Public Works

Enclosures

RECEIVED

JAN 3 1 2001

Electric Division

PREVENTATIVE MAINTENANCE PLAN

Westby Electric and Water Utility

FILING DEADLINE FEBRUARY 1, 2001

January 26, 2001

Gregg Hanson
200 North Main Street
Westby, WI 54667
608-634-3416
Ghanson@wppisys.org

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JAN 3 1 2001

Electric Division

This plan was prepared by the MEUW work group for PSC Rule 113.0607 for use by the 82 municipal electric utilities in Wisconsin and endorsed by PSC staff as meeting the requirements of Rule PSC 113.0607.

TABLE OF CONTENTS

		Page
I.	Preventative Maintenance Plan	2
П.	Inspection Schedule and Methods	2
III.	Condition Rating Criteria	3
IV.	Corrective Action Schedule	4
V.	Record Keeping	4
VI.	Reporting Requirements	• 4
VII.	Distribution – overhead inspection guide	5
VIII.	Distribution – underground inspection guide	8
IX.	Substation - Monthly inspection guide	10
X.	Substation – Annual Inspection Guide	18
XI.	Transmission - Annual Inspection Guide	20
XII.	Transmission – 5 Year Inspection Guide	21
	FORMS	
OVEF	RHEAD DISTRIBUTION INSPECTION FORM	7
UNDI	ERGROUND DISTRIBUTION INSPECTION FORM	9
MON	THLY SUBSTATION INSPECTION FORM	13 – 17
ANNU	JAL SUBSTATION INSPECTION FORM	19
ANNU	JAL TRANSMISSION INSPECTION FORM	22

I. Preventative Maintenance Plan

The PSC 113.0607 rule reads;

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Appropriate inspection and maintenance: system reliability.

- (1) PREVENTATIVE MAINTENANCE PLAN. Each utility or other person subject to this chapter, including persons who own electric generating facilities in this state who provide service to utilities with contracts of five years or more, shall develop and have in place its own preventative maintenance plan. This section is applicable to electric generating facilities as set forth at s. 194.491(5)(a)(1), Stats. Each plan shall include, among other things, appropriate inspection, maintenance and replacement cycles where applicable for overhead and underground distribution plant, transmission, generation¹, and substation facilities.
- (2) CONTENTS OF THE PLAN. (a) Performance standard. The Preventative Maintenance Plan shall be designed to ensure high quality, safe, and reliable service, considering: cost, geography, weather, applicable codes, national electric industry practices, sound engineering judgment and experience.
- 1 PSC staff interpretation is that generation applies to individual generators equal to or greater than 50 MW.

II. Inspection Schedule and Methods:

The purpose of this plan is to maintain or improve the electrical system reliability with the objective of increased municipal loyalty and satisfaction from our constituents. The goals are to meet and exceed the schedules established in this plan.

Exception reporting (inspected equipment not in good condition) will be the method of documentation on all inspection forms.

The scope of this plan is traditional and uses proven maintenance techniques. Unique operating and maintenance philosophies have not been considered. Also, manufacturer defects will be dealt with as they are communicated to this utility.

EVERY

SCHEDULE:	MONTHLY	ANNUAL	5 YEARS
Transmission (≥69Kv and above)	NA	NA	NA
Substations	X	X	X
Distribution (OH & UG)	X	X	X
		OH-IR	

Oh

The inspection of Distribution facilities will be by individual substation circuits on a 5-year cycle such that the entire system will be inspected every 5 years. Inspector instructions for inspecting all facilities and forms are included with the plan.

METHODS: Five criteria groups will be used to complete the inspection of all facilities.

- 1. <u>IR</u> infrared thermography used to find poor electrical connections and/or oil flow problems in equipment.
- 2. <u>RFI</u> Radio Frequency Interference, a byproduct of loose hardware and connections, is checked using an AM radio receiver.
- 3. <u>SI</u> structural integrity of all supporting hardware including poles, crossarms, insulators, structures, bases, foundations, buildings, etc.
- 4. <u>Clearance</u> refers to proper spacing of conductors from objects, trees and other utility cables.
- 5. <u>EC</u> equipment condition on non-structural components such as circuit breakers, transformers, regulators, reclosers, relays, batteries, capacitors, etc.

III. Condition Rating Criteria:

This criterion, as listed below, establishes the condition of a facility and also determines the repair schedule to correct deficiencies.

- 0) Good condition
- 1) Good condition but aging
- 2) Non-critical maintenance required normally repair within 12 months
- 3) Priority maintenance required normally repair within 90 days
- 4) Urgent maintenance required report immediately to the utility and repair normally within 1 week

IV. Corrective Action Schedule

The rating criteria as listed above determine the corrective action schedule.

V. Record Keeping

All inspection forms and records will be retained for a minimum of 10 years. The inspection form contains all of the required critical information i.e. inspection dates, condition rating, schedule for repair and date of repair completion.

VI. Reporting Requirements

A report and summary of this plan's progress will be submitted every two years with the first report due to the Commission by February 1, 2003. The report will consist of a letter documenting the percent of inspections achieved compared to the schedule and a description of maintenance achieved within the scheduled time allowance.

VII DISTRIBUTION - OVERHEAD INSPECTION GUIDE

STRUCTURE

- Pole Condition
- Pole Leaning
- Crossarm Condition
- Insulators, Deadend, Pin
- Excess Fill or Soil Removal
- Pole Steps
- Grounds Intact
- Ground Molding
- Down Guys
- Guy Markers
- Guy Bonding/Insulator
- Signage Location Number, Warning Sign
- Customer Equipment
- Conductor
- Tie Wires
- U Guard/Conduit Condition

EQUIPMENT

- Transformers
 - ✓ Oil Leaks
 - ✓ Bushing Condition
 - ✓ Grounding/Bonding
- Capacitors
 - ✓ Fuses Blown
 - ✓ Bushing Condition
 - ✓ Oil Leaks
 - ✓ Tank Bulged
 - ✓ Switches, Oil, Vacuum
 - ✓ Control Conduit/Wiring
 - ✓ Grounding/Bonding
- Switches GOAB, Inline, Disconnect
 - ✓ Insulator Condition
 - ✓ Operating Handle/Locks
 - ✓ Linkage
 - ✓ Grounding/Bonding
 - ✓ Switch Number
- Cutouts
 - ✓ Insulator Condition
 - ✓ Fuse Size Tag

VII DISTRIBUTION - OVERHEAD INSPECTION GUIDE (con't)

EQUIPMENT (CON'T)

- Arrestor
 - ✓ Insulator Condition
 - ✓ Connections
 - ✓ Ground Lead Disconnection
- Cable Terminators
 - ✓ Insulator Condition
 - ✓ Grounding/Bonding

CLEARANCES

- Ground Line
- Buildings, Bridges, Swimming Pool, Etc.
- Communications Facilities
- Fuel Tanks
- Other Electric Utilities
- Transmission Lines
- Over Streets, Roads, Alleys, Highways
- Tree Trimming
 - ✓ Clearance From Line
 - ✓ Vines on Poles
 - ✓ Danger Trees

INFRARED SCAN

- Main Three-Phase Feeders
- Priority Overhead Transformer Banks
 - ✓ Bushing Connectors Primary
 - ✓ Bushing Connectors Secondary
 - ✓ General Tank Heating
- Current & Voltage Transformers if Applicable

RFI CHECK

OH system with AM radio as each circuit is inspected

																						LOCATION	MAP AREA	OVERHEAD DISTRIBUTION INSPECTION FORM
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VIII DISTRIBUTION - UNDERGROUND INSPECTION GUIDE

STRUCTURAL (Exterior & Interior) Transformer, Primary Pedestal, Secondary Pedestal, Switchgear.

- Enclosure Condition
- Level/Leaning
- Security
- Grade/Accessibility (Shrubs, Customer Facilities, Fill/Excavation)
- Numbering
- Voids/Gaps
- Signage Location Number, Warning Sign
- Pad/Vault Condition

EQUIPMENT

- Transformers
 - ✓ Oil Leaks
 - ✓ Bushing Condition
 - ✓ Grounding/Bonding
 - ✓ Elbows
 - ✓ Arrestors
 - ✓ Feed-Through
 - ✓ Cable Condition
 - ✓ Secondary Connections
- Primary Pedestals
 - ✓ Elbows
 - ✓ Junction Condition
 - ✓ Grounding/Bonding
- Secondary Pedestals
 - ✓ Secondary Connections
- Switches URD Switchgear
 - ✓ Insulator Condition
 - ✓ Operating Handle Security
 - ✓ Linkage
 - ✓ Grounding/Bonding
 - ✓ Switch Number/Fuse Size & Number

INFRARED SCAN and RFI CHECK

- Main Three-Phase Feeders (Risers & Switchgear)
- Priority URD Transformer Banks
 - ✓ Bushing Connectors Primary
 - ✓ Bushing Connectors Secondary
 - ✓ General Tank Heating

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UNDERGROUND DISTRIBUTION INSPECTION FORM Date_

Inspected by

IX SUBSTATION - MONTHLY INSPECTION GUIDE

TRANSFORMER MAIN TANK:

- Oil in bushings
- Bushing and arrestor porcelain
 - ✓ Cracks or chips
 - ✓ Rust or dirt
- Oil leaks
 - ✓ Main tank
 - ✓ Sample valves
 - ✓ Radiators
- Radiator bank
 - √ warm on top, cool at bottom
- Tank pressure
- Tank oil level
- Temperature gauge
- Cooling fans

TRANSFORMER LTC or VOLTAGE REGULATORS:

- Tank oil level
- Drag hand positions
- Cabinet light
- Operation count
- Tank pressure
- Cabinet heater
- Cabinet contamination

TRANSMISSION CIRCUIT BREAKERS:

- OPEN/CLOSED indicator
- CHARGED/DISCHARGED indicator
- Cabinet light
- Cabinet heater
- Operations counter
- Bushings and supports
 - ✓ Cracks or chips
 - ✓ Rust or dirt
- Line and load side disconnect switches
 - √ Properly labeled
 - √ Aligned properly
- Handles grounded
- Emergency trip button
- Air / Oil compressors
- Air / Oil pressure gauge
- Spring operated mechanism
- Oil level gauge
- Tank oil leaks
- Reset switch
- Cabinet contamination
- Vents clean
- Gas pressures for GCBs

IX SUBSTATION - MONTHLY INSPECTION GUIDE (con't)

FEEDER CIRCUIT BREAKERS / RECLOSERS

- OPEN/CLOSED indicator
- CHARGED/DISCHARGED indicator
- Cabinet light
- Cabinet heater
- Operations counter
- Bushings and supports
 - ✓ Cracks or chips
 - Rust or dirt
- Line and load side disconnect switches
 - ✓ Labeled properly✓ Aligned properly

 - Handles grounded
- Emergency trip button
- Oil level gauge
- Tank oil leaks
- Reset switch
- Cabinet contamination
- Vents clean
- Gas pressures for GCBs

HIGH AND LOW VOLTAGE BUSS WORK:

- Bushing, insulator, arrestor, and support insulators
 - ✓ Chips or cracks
 - ✓ Rust or dirt
- Bird nests
- Potential transformers bushings
 - ✓ Cracks or chips
 - ✓ Rust or dirt
- Cable terminators

 - ✓ Leaking fluid✓ Cracks or chips

MANUAL SWITCHES:

- Properly labeled
- Ground connections
- Positioning and alignment
- Bushing and support insulators
 - ✓ Cracks or chips
 - ✓ Rust or dirt

MOTOR OPERATED SWITCHES:

- OPEN/CLOSED indicator
- Properly labeled
- Cabinet heater
- Operations counter

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IX SUBSTATION - MONTHLY INSPECTION GUIDE (con't)

CONTROL HOUSE/MISCELLANEOUS:

- Clock displays proper time
- AC/DC load center breakers
- Room temperature
- Rodents
- Panels labeled properly
- Panel lights
- Annunciator panel
- Panel meters
- SCADA system RTU
- SCADA alarms
- Position indicators agree
- Relay target information
- Emergency contact directory & dial tone for phone
- Safety Equipment

BATTERY:

- Liquid levels
- Proper float voltage on charger and battery
- Specific gravity in pilot cell
- Personal Protective Equipment
- Connection corrosion
- Leaking cells
- Dated solution in eyewash station

YARD AND FENCE:

- Fire extinguisher charged
- Fence ground connections
- Fence secured
- Security and emergency lights
- Site base and grade
- Standing water
- Warning signs

MONTH	YS	SUBSTATION INSPECTION	N 50011	
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SUBSTATION:				
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Bushing and Arrestor				
Oil Leaks				
Main Tank				
Sample Valves				
Radiators				
Radiator Bank				
Tank Pressure				
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Cooling Fans				
TRANSFORMER LTC or VOLTAGE REGULATORS		RATING: 0 1 2 3 4	(Circle One)	
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FEEDER CIRCUIT BREAKER /				
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OPEN/CLOSED Indicator			CORRECTED	BY
CHARGED/DISCHARGED Indicator				
Cabinet Light				
Cabinet Heater				
Operations Counter				
Bushings and Supports				
Line and Load Side Disconnect Switches				
Emergency Trip Button				
Oil Level Gauge				
Tank Oil Leaks				
Reset Switch				
Cabinet Contamination				
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Gas Pressures for GCBs				
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Bushing, Insulator, Arrestor, and Supports		
Bird Nests		
Transformer Bushings		
Cable Terminators		
MANUAL SWITCHES	E RATING: 0 1 2 3 4	(Circle One)
Properly Labeled		
Ground Connections		
Positioning and Alignment		
Bushings and Supports		
MOTOR OPERATED SWITCHES	RATING: 0 1 2 3 4	(Circle One)
OPEN/CLOSED Indicator		
Proper Labeling		
Cabinet Heater		
Operations Counter		
locking criteria		

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AC/DC Load Center Breakers	╁╾╂								
Room Temperature	+-+								
Rodents	+-+								
Panels Labeled Properly	+								
Panel Lights	++								
Annunciator Panel	 								
Panel Meters	 								
SCADA System RTU									
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afety Equipment	1		····						
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YARD & FENCE E Extinguisher Charged ace Ground Connections ace Secured curity and Emergency Lights		RATING:	0 1	2	3	4		Circle One)	

X Substation - Annual Inspection Guide

- Check equipment for level
- Check condition of concrete pads
- Perform oil and DGA analysis
- Battery
 - ✓ Intercell strap resistance
 - ✓ Individual cell voltages
 - ✓ Cell specific gravity
- Nameplate legible
- Equipment paint condition
- Proper equipment ID labels
- IR / RFI scans and checks

ANNUAL SUBSTATION INSPECTION FORM

Date_

_Inspected by __

Date		ָ קַּ	spec	Inspected by					Substation	l	
		ا ا	JBSTA	SUBSTATION INSPECTION CRITERIA	OTION	CRITER	Ā		COMMENTS	MAINTE	MAINTENANCE
EQUIPMENT LISTING	Check equipment for level	Check condition of concrete pads	erform oil and DGA analysis	attery checks - Intercell strap esistance, Individual cell voltages, ell specific gravity	ameplate legible	quipment paint condition	oper identification labels	/ RFI scans and checks	Rating Criteria 0) Good Condition 1) Good Condition but aging 2) Non-critical Maintenance Required 3) Priority Maintenance Required 4) Urgent Maintenace Required	e Item Corrected	rected By
Transformer	-	_	F	m r	N	E	Р	ĮF.		Dat	Cor
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Feeder CBs / Reclosers						\downarrow	\downarrow	\perp			
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Switches					\bot	_	_	_			
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Transmission line RFI											

XI TRANSMISSION - ANNUAL INSPECTION GUIDE

STRUCTURE

- Pole Condition
- Pole Leaning
- Crossarm Condition
- Insulators, Deadend, Pin
- Excess Fill or Soil Removal
- Pole Steps
- Grounds Intact
- Ground Molding
- Down Guys
- Guy Markers
- Guy Bonding/Insulator
- Signage Location Number, Warning Sign
- Customer Equipment
- Conductor
- Tie Wires

EQUIPMENT

- Switches GOAB, Disconnect
 - ✓ Insulator Condition
 - ✓ Operating Handle/Locks
 - ✓ Linkage
 - ✓ Grounding/Bonding
 - ✓ Switch Number
- Arrestor
 - ✓ Insulator Condition
 - ✓ Connections

CLEARANCES

- Ground Line
- Buildings, Bridges, Etc.
- Communications Facilities
- Fuel Tanks
- Other Electric Utilities
- Over Streets, Roads, Alleys, Highways
- Tree Trimming
 - ✓ Clearance From Line
 - ✓ Vines on Poles
 - ✓ Danger Trees

XI TRANSMISSION - ANNUAL INSPECTION GUIDE (con't)

RFI CHECK

- Splices
- Connectors
- Dead Ends
- Switches
- Structures

XII TRANSMISSION - 5 YEAR INSPECTION GUIDE

IR SCAN

- Splices
- Connectors
- Dead Ends
- Switches

ANNUAL TRANSMISSION INSPECTION FORM
Date
Inspe

																			LOCATION	MAP AREA
H	\dashv	\dashv	1	7						\vdash	-			t	\dagger	1			Pole Condition/Leaning	
\Box	\dashv	1													T				Crossarm Condition	
\Box	\dashv		\exists											T		٦			Insulators, DE, Pin	
		\dashv	7											T					Soil Conditions	
H	7	\dashv									 			T					Pole Steps	ITS
H										Γ		T	T	T	1				Grounds Intact, Molding	R C
H				\dashv							Γ	T		T					Down Guys and Markers	STRUCTURE
											Γ			T	1				Guy Bond, Insulator	교
H								 		T	T	T	T	T	1				Signs, Loc#, Warning	
							T		一	1	T			1	1				Customer Equipment	
H							\vdash	\vdash	T	T	T		T	T					Conductor and Ties	
		01						T	T	T	1	T		1	7			Γ	RFI Check	
																			Switches	EQUIPMENT
																			Arresters	MENT
							T	T		T	T	T	T						Tree Trimming	
					Г	T		T				T	T	T					Ground Line Clearances	
					Γ			T	1		T		T						Building Clearances	CLEARANCE
						Τ				T									Streets, Roads, Alleys	ĮČE
					T		T	T	T		T			7					Communication Clearance	
	-																		Rating Criteria 0) Good Condition 1) Good Condition but aging 2) Non-critical Maintenance Required 3) Priority Maintenance Required 4) Urgent Maintenace Required	COMMENTS
																			Date Item Corrected	
					+														Corrected By	